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NASSAU RESEARCH & DEVELOPMENT ASSOCIATES INC.
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INTERIM DEVELOPMENT REPORT
FOR
PAINT FINISH, OPTIMUM PROTECTIVE FOR WAVEGUIDES

This report covers the period between Nov. 1, 1953 to Jan. 31, 1954

Submitted by
NASSAU RESEARCH AND DEVELOPMENT ASSOCIATES INC.
66 Main Street
Mineola, N. Y.

To
NAVY DEPARTMENT BUREAU OF SHIPS ELECTRONICS DIVISION

Contract Number NObsr - 64065 Index Number NE - 111616
February 10, 1954

Prepared by James E. McFarland

INTRODUCTION

A general description of the progress for the first quarterly period is given in this report, and details of the work will be given in the final report.

PART I

(A) Purpose

The purpose of this contract is to investigate materials in order to determine the optimum "paint" finish for RG-69/u, RG-48/u, RG-52/u, and Navy type 14 ACM waveguide. The optimum finish shall be better than the presently used zinc chromate primer in the following requirements:

(a) The protective finish shall protect from corrosion brass, silver plated brass, stainless steel, and silver or nickel plated stainless steel during 100 hours salt spray.

(b) The protective finish when applied to the inside of waveguide shall have the lowest possible electrical loss before and after salt spray in requirement (a)

In addition to the preceding requirements the protective finish shall be capable of easy field application.

(B) Detailed Factual Data

In accordance with the specifications of the contract, the investigation is being conducted in the 8200 to 12400 mc. frequency range, and the tests are being made on RG-52/u waveguide (1" x $\frac{1}{2}$ " O.D., BRASS). Each test sample consists of a straight section of RG-52/u waveguide with a RG-39/u cover flanges terminating each end. The length of the sample guide was selected as two feet, because the length is sufficient to give an attenuation value of an order

C that can be measured accurately, and it is short enough to allow an even, smooth coating of paint to be applied to the inside of the waveguide.

The coatings on the samples consist of standard commercial finishes that were recommended by paint manufacturers and special formulas submitted by a paint consultant working in conjunction with other paint manufacturers. Included in the finishes are the following:

- (a) Regular Alkyd Resins
- (b) Modified Alkyd Resins
- (c) Vinyl Resins
- (d) Epoxy Resins
- (e) Acrylic Resins

C The finishes on the inside of the test samples were applied in smooth, even coats, with the thickness of one coat generally .0002 to .0003 inches. Several coats were applied so that a total thickness of .001" resulted. The total thickness was controlled in order to establish a uniform basis for comparing the electrical properties of the various finishes before and after salt spray.

The following method of finish application gave excellent control of the film thickness and smoothness. With the test sample in a vertical position, the guide was filled with the coating material which was allowed to drain through a valve at the bottom end. The thickness of the resulting film depends on the drainage rate, the drying time of the

coating material, and the solid content of the material. In general, a greater film thickness results with short drying time, high solid content, and high drainage rate.

Attenuation measurements were made by measuring the V. S. W. R. of the test samples with one end terminated by a short. The tests before salt spray show that the coated samples have low loss. Compared to the unpainted samples which has an attenuation of app. .07 db/ft., the painted samples vary in attenuation from 0.07 db/ft. to approximately .10db/ft..

After the completion of the electrical tests, the outside of each test sample was coated with its respective finish preparatory to salt spray testing.

(C) Identification of Personnel

The personnel involved in work on this contract and the total number of hours spent by each to January 31, 1954, are as follows:

	<u>Man Hours</u>
1. J. McFarland (Engineer)	310
2. S. Casper (Engineer)	15
3. B. Joachim (Paint Consultant)	24
	<hr/>
Total Man Hours	357

PART II

Program for Next Interval

The contract will be completed during the next

quarterly period. The work will consist of salt spray tests and attenuation measurements following the salt spray tests. Following the completion of the tests and measurements the results will be analyzed to determine the most satisfactory finish which satisfies the goal of this contract. The final report will be written containing the detailed measurement data and final recommendations.

NASAC RESEARCH & DEVELOPMENT ASSOCIATES, INCORPORATED
 66 Main Street
 Minnola, N.Y.

PROGRAMS SCHEDULE

Contract NUBSR 64065

Period covered: 11/1/53-1/31/54

DESCRIPTION	1953				1954			
	NOV.	DEC.	JAN.	FEB.	MAR.			
Preliminary Study								
Electrical test								
Salt Spray tests								
Test Sample Preparation								
Final report								

LEGEND

Work completed

Schedule of projected operation

James M. McFarland
 Engineer in Charge
 2/10/54